

FIELD TRIP GUIDE

ROADLOG THROUGH PETRIFIED FOREST NATIONAL PARK

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This roadlog begins at the north entrance of the park and is adapted from Ash (1974), Gillette et al. (1986), and Parker (2005). Distances are in miles.

0.0 Turn right off of Interstate 40 and follow signs to the park entrance.

0.2 Enter Petrified Forest National Park.

0.3 Painted Desert Visitor Center and Park Headquarters to the right. Go straight ahead to the entrance station. Completed in 1962, this complex was placed on the National Register of Historic Places in 2005. It is one of the only remaining examples of NPS "Mission 66" architecture designed by noted architect Richard Neutra. These buildings house the museum collections and a fossil preparation facility, as well as park administrative offices and personal residences. A bookshop and restrooms are in the headquarters building. A souvenir shop, lunchroom and gas station, managed by the Fred Harvey (Xanterra) organization, are also situated here.

0.4 Entrance Station. Eight viewpoints are scattered along the highway for the next few miles where the Painted Desert, Black Forest, and other features may be observed. Each viewpoint has something different to offer in the way of scenery. If visitors have the time, they should stop at each point for rewarding and slightly different views of the Painted Desert, Black Forest and other features.

For several miles, the road lies on a thin veneer of Cenozoic sediments and basalts which overly the colorful Upper Triassic Chinle Formation.

0.8 Tiponi Point. This is the first of several view points overlooking the "Painted Desert." The majority of reddish rocks visible from here and all along this escarpment belong to the Petrified Forest Member of the Chinle Formation. The brownish strata above the Chinle Formation are assigned to the Tertiary Bidahochi Formation.

1.7 Tawa Point.

2.0 Kachina Point. Excellent views of the Painted Desert and the large deposit of black-colored petrified wood called the Black Forest are visible from this viewpoint. The dry wash

on the floor of the broad valley is appropriately named Lithodendron Wash because so many petrified logs are found in it and on the adjacent floodplain and hillsides. Chinde Mesa is on the skyline directly north of this point.

The prominent white band visible (Fig. 1A) on the sides or tops of many hills adjacent to Lithodendron Wash is a reworked volcaniclastic unit known as the Black Forest Bed (Ash, 1992). This distinctive unit was named for the Black Forest that occurs within it. Stratigraphically the Black Forest Bed lies a little below the middle of the Petrified Forest Member of the Chinle Formation (Ash and Creber, 1992). Although the Black Forest Bed is relatively thin and has a limited distribution in just the northern part of the park it is quite significant. Riggs et al. (2003) obtained a radiometric date of 213 ± 1.7 ma for this unit using detrital zircons. This date is important because it is the only absolute date for the Chinle Formation. The unit is of considerable interest to paleobotanists because it contains a small and rather unique flora and was the source of the holotype of the common Late Triassic wood *Araucarioxylon arizonicum* Knowlton (1888). In addition to *A. arizonicum* the flora includes the peculiar woods *Woodworthia arizonica* Jeffrey (1910) and *Schilderia adamanica* Daugherty (1934), as well as a small amount of mostly unidentifiable comminuted leaf matter.

Historical evidence indicates that the first non-Native Americans who explored a part of the area now included in Petrified Forest National Park and saw the petrified wood it contains arrived in the broad valley north of this viewpoint on December 2, 1853. They were members of the U.S. Army exploring expedition led by Lieutenant A. W. Whipple and entered the park area through the broad valley ahead of us. Whipple was so impressed by all the wood that was scattered about that he named the wash draining the area Lithodendron Creek, now more appropriately called Lithodendron Wash because it rarely has water in it. Fragments of the wood were collected and turned over to the American geologist W. P. Blake who reported (1856) that the cells in the wood "...are distinctly and beautifully preserved, and can be clearly seen by the naked eye." A German traveler by the name of Mollhausen who was accompanying the Whipple expedition also collected some small fragments of petrified wood and gave them to the famous German paleobotanist H. R. Goeppert for study. After examining them, Goeppert reported (in Mollhausen, 1858) that the wood was araucarian and suggested that it should be called

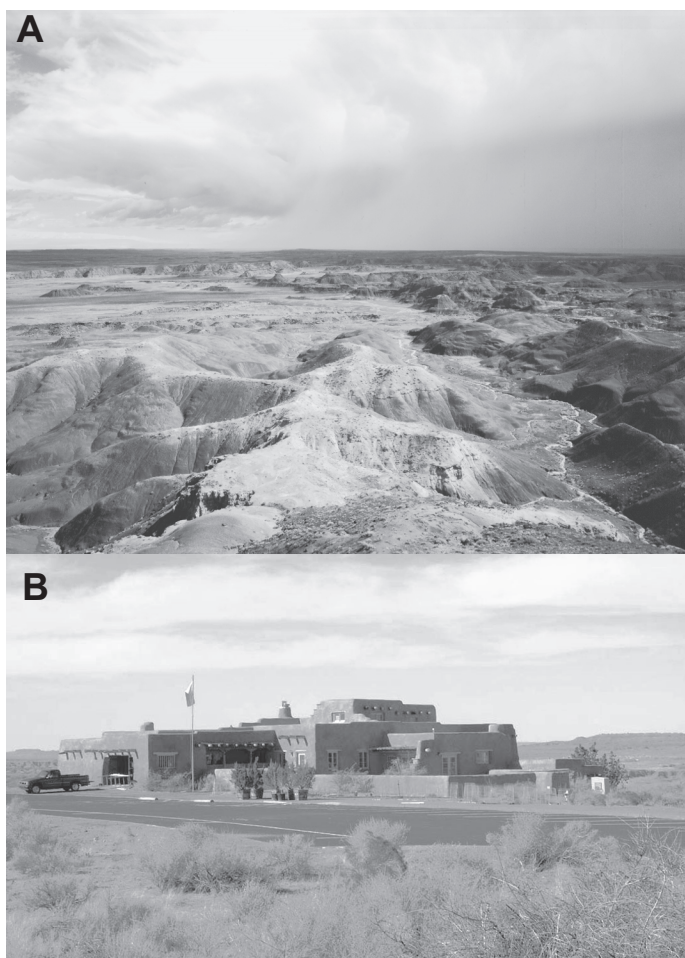


Figure 1. A, the Painted Desert looking north from Kachina Point. The whitish bed capping the hills in the front-center of the photo is the Black Forest Bed; B, the Painted Desert Inn in March 2006 after major renovations.

Araucarites mollhausianus but he neglected to properly describe it so the name is considered a “nomen nudum.”

In May 1879, a small detail of soldiers under the command of Lieutenant J. F. C. Hegewald was sent to Lithodendron Wash from Fort Wingate, New Mexico to obtain two petrified logs for the Smithsonian Institution. The detail camped near Bear Spring, a few miles northeast of here, where they collected two sections of a large black log from the Black Forest Bed and transported them to Fort Wingate on special stone wagons. In a report, Hegewald (in Swaine and Hegewald, 1882) noted that the Navajos who lived in the area of Lithodendron Wash “thought it strange the Great Father in Washington” should want the logs. That may be so, but the soldiers who did the actual digging and lifting of the logs probably had much saltier comments to make about the project and General of the Army William T. Sherman who had proposed it. The sections were eventually shipped to the Smithsonian together with another log from the Fort Wingate area where they are now on display. There, Frank Knowlton studied them in thin section, and reported (1888) that they represented a new species which he called *Araucarioxylon arizonicum*.

He admitted that the name might be a synonym of *Araucarites mollhausianus*, the name Goeppert had applied to the wood Mollhausen had collected from Lithodendron Wash. Since that name is a *nomen nudum*, Knowlton could not verify his suspicion. It may never be possible to determine the identity of that wood because recent efforts by one of us (SRA) to locate the material studied by Goeppert indicate that it probably was destroyed during World War II.

The Spanish Pueblo Revival style buildings at the point include the famed Painted Desert Inn (Fig. 1B), which was originally constructed in the 1920s and remodeled in the 1930’s by the CCC, after the structure and surrounding land was purchased by the National Park Service. The interior design work was directed by famed architect Mary Jane Colter. For many years a souvenir shop, restaurant, bar and gas station operated at the Inn but eventually the building became unstable because of foundation problems and was closed. In 2005, the Painted Desert Inn was stabilized and meticulously restored to its 1947 appearance when it was run by the Fred Harvey Company.

2.3 Road to Chinde Point picnic area. Picnic tables, shelters, and rest rooms are available at the picnic area. An excellent view of Chinde Mesa, a south-facing escarpment several miles north of the Park, is visible from Chinde Point. Chinde is a Navajo term meaning devil or ghost. Some of the logs in the Black Forest Bed can also be seen from this point.

In 1985, the partial skeleton of a small early dinosaur *Chindesaurus bryansmalli* (known to some affectionately as “Gertie”) was collected below this point. At the time it was featured as the ‘world’s earliest dinosaur’ and its collection received widespread media attention. While technically not the world’s ‘earliest dinosaur’; it is probably a basal member of the Saurischia and still of significance. The remains and a reconstruction of “Gertie” are on display in the Rainbow Forest Museum near the south entrance to the park.

2.9 Pintado Point. Pintado is the Spanish word for painted and refers to the Painted Desert which is so widely visible from this view point. This is the easternmost part of the Painted Desert which stretches northwest from here to the Colorado River and thence northward along the Echo Cliffs. Although Spanish explorers have been credited in popular publications with naming the Painted Desert, there is absolutely no primary documentary evidence to support this claim. In fact, the best evidence indicates that the name was coined by members of the exploring expedition led by Lieutenant Joseph P. Ives which passed north of here on its way to the Colorado River. The authorship of the name Painted Desert is attributed to the Ives Expedition in the most recent edition of “Arizona Place Names.”

4.0 Nizhoni Point. Nizhoni is the Navajo term for beautiful.



Figure 2. The Painted Desert from Whipple Point looking northeast. The mesa to the right consists of deposits of the Petrified Forest Member of the Chinle Formation (note the white band that represents the Black Forest Bed) capped by lacustrine and volcanic deposits of the Miocene/Pliocene Bidahochi Formation.

This site offers views of the Devil's Playground to the west and the Dinosaur Hill area to the southwest. The Devil's Playground area was prospected heavily by Charles Camp in the 1920s, Ned Colbert in 1946, and the UCMP in the 1980s. Phytosaur skulls are common in the area, including the holotype of *Machaeropsopus lithodendrorum* (*Leptosuchus crosbiensis*) and specimens of *Pseudopalatus*. In 2002, another complete skull of *Leptosuchus* sp. was collected from the area by National Park Service personnel, the first complete phytosaur skull collected from the park in 16 years. A second skull of *Leptosuchus* sp. was collected in 2005. The lighter colored outcrops in the Devil's Playground area belong to the Sonsela Member of the Chinle Formation. They are exposed due to structural folding between those outcrops and Nizhoni Point.

To the southwest the Petrified Forest Member is exposed along a north facing escarpment. This area includes famous fossil localities such as Lacey Point, Dinosaur Hill, and the Giving Site, which was discovered in 2004. The Giving Site has produced more dinosaur material than any other site in the southwest except for Ghost Ranch and possibly the Snyder Quarry (Heckert et al., 2003). To date, three partial coelophysoid skeletons, isolated coelophysoid elements, and a partial *Chindesaurus* skeleton have been recovered. In addition, the Giving Site has provided numerous skeletons of the pseudosuchian *Revueltosaurus callenderi*, which was originally believed to represent an ornithischian dinosaur (Parker et al., 2005).

Dinosaur Hill (PFV 40) and Lacey Point (PFV 27) are both quarries discovered in the 1980s by crews from the University of California, Berkeley. Lacey Point is a productive microsite (Murry, 1989), while Dinosaur Hill produced a partial theropod skeleton (Padian, 1986), a partial skeleton of



Figure 3. Looking west along old Route 66 (marked by the telephone poles). This 1922 Studebaker is part of an interpretive exhibit on Route 66.

the crocodylomorph *Hesperosuchus* (Parrish, 1991; Sereno and Wild, 1992), numerous *Revueltosaurus* teeth (Padian, 1990), as well as a large amount of amphibian material referable to *Apachesaurus gregorii* (Hunt, 1993). Just north of Dinosaur Hill is the "Billingsley Hill" Locality (PFV 34) where the tooth of an enigmatic amniote was collected in 1984. This specimen was previously believed to represent a traversodontid synapsid (Long and Murry, 1995) but its true affinities are still unclear (Irmis and Parker, 2005).

4.2 Whipple Point. This point is named after Lieutenant A. W. Whipple, who discovered the Black Forest section of the Petrified Forest on December 2, 1853 as described above. It offers views the Painted Desert (Fig. 2).

4.7 Lacey Point. This point is named in honor of Congressman John F. Lacey of Iowa, an ardent supporter of American antiquities in the early 20th century who introduced bills in Congress in 1902, 1904, and 1905 to establish Petrified Forest National Park. For various reasons, the bills always failed to pass both houses of Congress and it was not until December 1906 that President Theodore Roosevelt, using the powers granted him by the newly authorized Antiquities Act, established Petrified Forest National Monument.

4.9 Route 66. The line of telephone poles on either side of the park road follows the route of the original Route 66, which was the main highway through this area until I-40 was completed in the early 1960s. These poles carried wires used for long distance telephone services until they were transferred to relay stations a few years after Route 66 was abandoned and then to satellites.

5.0 Overpass over Interstate 40. The surface of the road slopes southward at a low angle to the Puerco River a distance of almost 4 miles.

8.9 On the left, there is a small exposure of the upper part of



Figure 4. Looking south along the main park road towards a mesa capped by the sandstone facies of the Newspaper Rock bed in the Puerco River Valley.

the Chinle Formation in a hill that rises above the general topography of the area. At one time, the material in the hill was quarried for road material. The hill is informally known as “Rattlesnake Hill.”

Nearly all of the rocks that we can see south of here are assigned to the Chinle Formation. The sloping surface of the mesa across the river is held up by the dip slope of the northward dipping (3°) Newspaper Rock bed (Fig. 4). The bed was deposited in a shallow meandering northeastern flowing stream. The name of this bed is derived from Newspaper Rock, a large talus block of this bed which is covered with many petroglyphs. At Newspaper Rock, the bed is about 30 feet thick and forms a distinct massive cliff. It thins toward the southeast and within a few miles of Newspaper Rock it divides into several thin tongues. Eventually they grade into mudstone deposits. The Newspaper Rock bed is of interest because it provides an excellent marker bed in the otherwise more or less homogeneous Blue Mesa Member of the Chinle. Also, most of the leaf localities in the Petrified Forest are closely associated with the bed.

The trees on the left are all that is left of a homestead that was bought out by the federal government.

10.2 Burlington Northern-Santa Fe Railroad Overpass.

10.3 Adamana. Road to the right (west) leads to the village of Adamana (Fig. 5). The town was established in 1890 by the Santa Fe Railroad Company as a stop where trains could take on water and passengers could eat. Tours of the Petrified Forest also originated here. Installation of a mill to grind petrified wood into abrasives in Adamana convinced some of the residents of northern Arizona that the petrified forests would totally disappear if they were not protected by the federal government. Through their action, the largest deposits of petrified wood in Arizona were preserved. Some say that the town was named after one of the residents, Adam Hanna. According to the paleobotanist, Lyman Daugherty, Adam Hanna and his girl friend, Anna, had a hotel there which was named “Adam and Anna.” Later the name was shortened to Adamana. Adam Hanna made a living by running the hotel and by taking tourists on tours into the Petrified Forest. Lyman Daugherty, who first described the Chinle flora, tells of an incident that occurred when Adam Hanna was still running the hotel. It

seems that one night, a group of tourists from New York arrived at the hotel at a time when there was no food available. Adam butchered a calf at 3 o’clock in the morning so the guests would have meat for breakfast. The guests, however, refused to eat it because as they explained, they were vegetarians. On hearing this Adam said, “I don’t give a..... about your religion, you will either eat veal or go hungry.”

John Muir, the famous nineteenth century naturalist lived here briefly in 1905-1906 while he explored the ‘fossil forests’, and the town was also the base of operations for paleontologist Charles Camp in 1921 and 1923. The advent of a bridge over the Puerco River and the decline in railroad travel after Route 66 was completed reduced the viability of the town. Finally, a fire in the 1970s destroyed the Forest Hotel essentially marking the end of Adamana. Today, all that is left of the town consists of three structures and two inhabitants. This is private property and visitors are not welcome without permission. A natural gas storage plant sits north across the tracks from the town site.

10.6 Bridge over the Puerco River. The Puerco, or muddy, river originates northwest of Grants, New Mexico and flows southwestward into east-central Arizona, where it unites with the Little Colorado River a few miles east of Holbrook. During the spring and early summer, the Puerco often contains water, but most other times it is dry. When the bridge that preceded



Figure 5. Robert R. Alton and his general store in Adamana, Arizona circa 1923. Photo by Charles L. Camp (courtesy of the UCMP).

this structure was completed in 1930 and an access road was built to it from Route 66, tourists no longer patronized the facilities at Adamana and the little town soon withered and died.

10.9 Puerco Indian Ruins to left. Archaeological investigations indicate that this small village or pueblo was occupied about 600 years ago. The pueblo is built on the top or dip slope of the northward dipping Newspaper Sandstone bed. A significant fossil leaf locality (Axsmith and Ash, this volume) which has been investigated in the past decade is on the north east side of the pueblo and has yielded several species not known from other localities in the park.

Continue south on the park road traveling on the top of the Newspaper Rock bed in the Blue Mesa Member of the Chinle Formation.

11.7 Turn off to Newspaper Rock. As we slowly turn to the left after passing the turnoff, we see exposures of the Blue Mesa Member that are above the Newspaper Rock bed. On the eastern horizon, Blue Mesa, a large mesa capped by the Flattops One Bed of the Sonsela Member is visible. It is underlain by about 100 feet of blue-gray mudstone assigned to the Jim Camp Wash beds (Woody, this volume).

13.1 The highway begins to swing to the right (south). As it does, we see that the sandstone facies of the Newspaper Rock bed have thinned considerably and in this area are represented by several thin tongues which disappear to the east, just beyond the highway. Note the candy-striped redbeds just above the thin beds of sandstone on the left. The candy striped beds are thought to be splay deposits associated with the sandstones (Demko, 1994).

13.5 The road cut we are now passing through was constructed during the early 1930s by members of the CCC. During its construction, fossil leaves were noted in the greenish mudstone directly beneath one of the tongues of sandstone of the Newspaper Rock bed that is exposed here. Many of the fossils collected here at that time were turned over to Lyman Daugherty for study, who described them in 1941. See the article on the biostratigraphy of the park by Parker in this volume for more details. The large conical hills on the right are termed the Tepees.

13.8 Pull into parking area on the right and park. Blue Mesa is to the left. The turnout here leads to the old Blue Mesa Road. This road originally led to a turnout, picnic area, and trailhead, and was closed in the 1950s. This is not possible today and more conventional methods (e.g., walking) must be used. The prominent reddish band in the Tepees buttes is a pedogenic horizon associated with the Newspaper Rock bed. This sequence of sandstones and mudstones is incised into

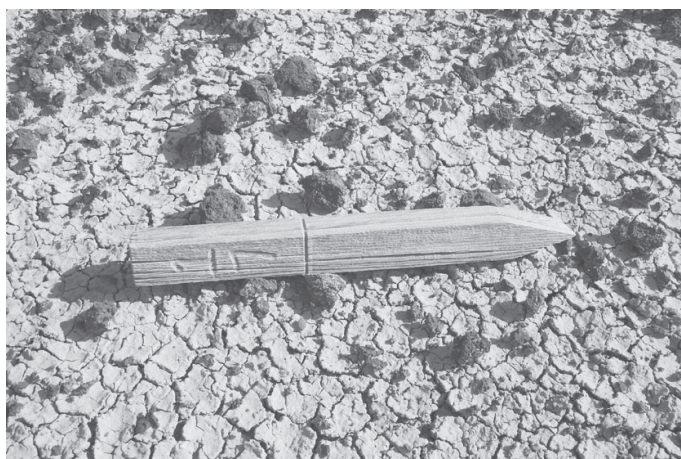


Figure 6. Stake #17 from Colbert's (1956, 1966) study of erosional rates in the Chinle Formation. This stake had washed out at some point during the study and Colbert (1966) noted it as missing.

lower Blue Mesa Member deposits and contains a wealth of plant and trace fossils. Interestingly, no vertebrate fossils have ever been recovered from within or below this sequence.

In 1956, Edwin Colbert placed wooden stakes in the mudstones of this area to determine erosional rates in the badlands (Fig. 6). Colbert (1956; 1966) determined that approximately 2.5 to 5.7 mm of erosion occurred on these surfaces each year. Many of these stakes are still in place today.

Several stumps that appear to be in the position of growth have been found in the badlands at the western base of Blue Mesa. See Gottesfeld (1972), Ash and Creber (1992), and Jones and Ash (this volume) for details.

Detour. Short hike into badlands to examine fossiliferous sites in the Blue Mesa Member, many of which are of historical significance (Fig. 7). Here the group will split to examine either sites pertaining to vertebrate paleontology or sites pertaining to paleobotany. Sites to be visited for the vertebrate paleontology portion include: the Alexander/Camp 1921 campsite (Fig. 7A); the type locality of the phytosaur *Machaeroprotopus* (= *Leptosuchus*) *adamananensis*, excavated by Charles Camp in 1921; the Crocodile Hill Quarry, excavated by Camp in 1923 (Fig. 7C); the Dying Grounds fossil locality; and the Phytosaur Basin locality (Fig. 7D). Sites to be visited by the paleobotany group include the Blue Mesa Stump field (Fig. 7B), the original fossil plant locality discovered in 1932; and several more of Daugherty's and Ash's localities in the Tepees area.

After returning to vehicles continue southward.

15.5 Junction. Turn left on Blue Mesa road, heading east, to drive up onto Blue Mesa. Blue Mesa is capped by the Flattops One bed (the traditional Sonsela Sandstone Bed), while the flanks are the Jim Camp Wash beds, with the Blue Mesa

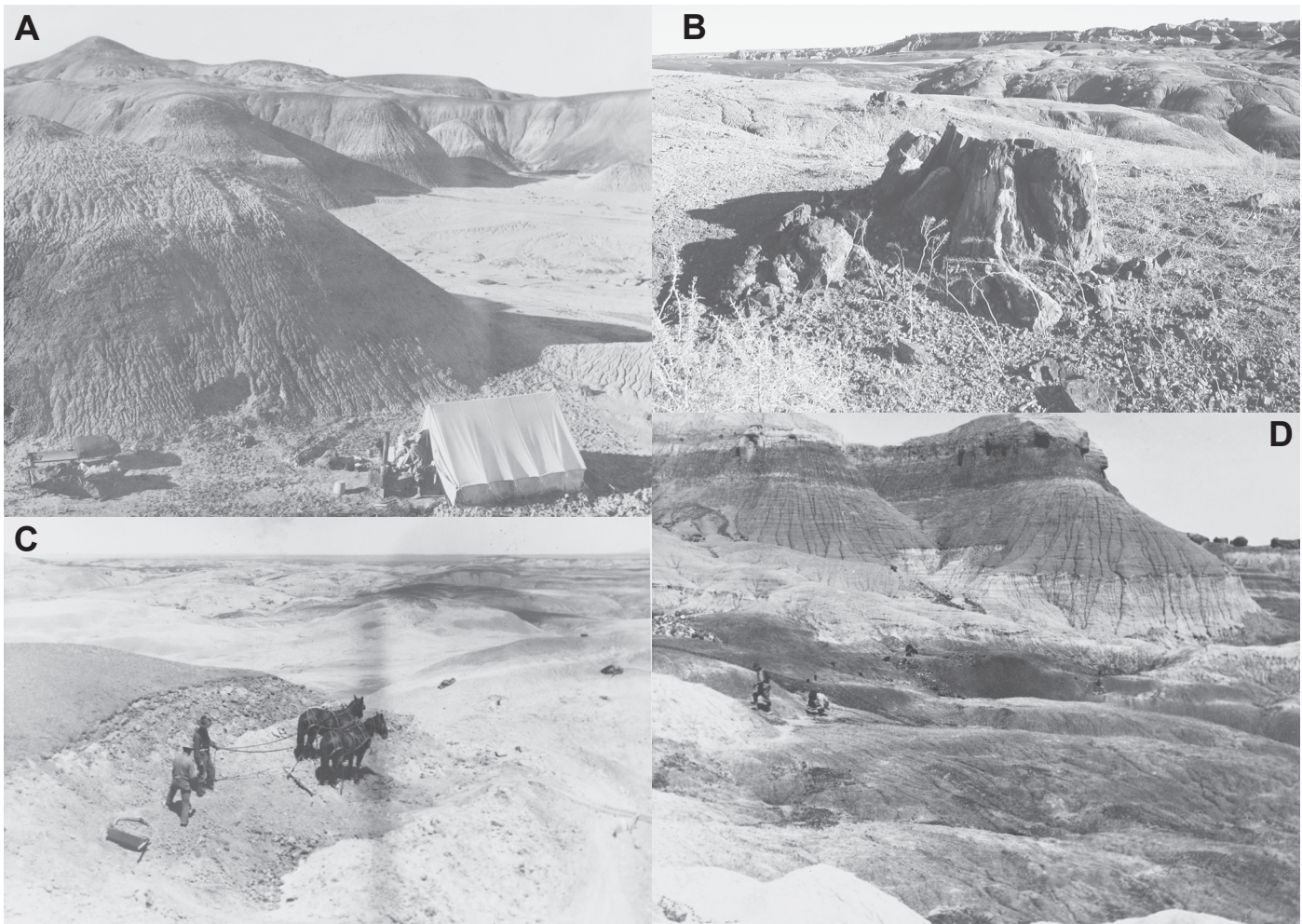


Figure 7. Historic paleontological localities in the Blue Forest area. *A*, 1921 campsite of Annie Alexander and Charles Camp (courtesy of the UCMP); *B*, Blue Mesa stump field; *C*, using a plow and scraper to uncover the bone bed at Crocodile Hill, 1923 (courtesy of the UCMP); *D*, collecting fossils at Phytosaur Basin, 1921 (courtesy of the UCMP).

Member at the base. Blue Mesa is the type section of the Blue Mesa Member (Lucas, 1993); however, this earlier designation included much of what is now considered to be the Sonsela Member (Heckert and Lucas, 2002; Woody, 2003).

17.6 Overlook. Pedestal logs (*Araucarioxylon arizonicum*) in the Flattops One bed. This spot also allows for a distant view of the Dry Creek Tank area where the type specimens of the phytosaurs *Pseudopalatus mccauleyi* (Ballew, 1989) and “*Machaeropsopus*” *tenuis* (Camp, 1930b) were collected. These sites are on private property originally outside of the park; however, both sites fall within the new administrative boundary of 2004.

17.9 Overlook. This spot offers an excellent view of Blue Mesa Member exposures to the north and northwest of Blue Mesa. The “Camp Butte sandstone” (=Rainbow Forest Bed) is well exposed at the base of the cliff and in isolated patches above the Blue Mesa Member mudstones. The “sinking ship” butte to the north consists mainly of the Sonsela Member with a thin capping remnant of Petrified Forest Member. The trough

of a broad northwest-southeast trending syncline is preserved in this hill. A bank of fresh water clam shell is present in the rocks here.

Lunch.

Retrace route to main park road.

20.1 Junction. After stopping, turn left on main park road. Continue southward. For the next mile or so, we will be passing over a relatively flat area developed on the Blue Mesa Member of the Chinle. Just after we pass an irregular erosional remnant of the Chinle which stands above the general topography of the area on the right, the road starts a slow ascent of a mesa that is capped by the Flattops One Bed of the Sonsela Member (see Parker, this volume).

21.2 Lots Wife/King’s Throne. The landform to the right of the road is called Lots Wife. A sandstone pinnacle at the top of the mudstone hills was a local landmark for decades (Fig. 8); however, after an abnormally wet spring and a period



Figure 8. The landform known as “Lots Wife” as it appeared before the sandstone pinnacle collapsed in April of 2005.

of high winds in April 2005, the sandstone pinnacle collapsed. The landform to the left of the road is called “King’s Throne”. The base of both of these features are the Rainbow Forest beds. Woody (2003) traced this bed into the Blue Mesa area to the north where it was informally called the “Camp Butte sandstone” (Murry, 1990).

Ascend Agate Bridge Mesa.

22.3 Roadcut in Flattops One bed at top of mesa. Just past Agate Bridge turn off on the left the park road cuts through the Flattops One bed. Note the channel structures preserved in this sandstone in cross-section. Paleocurrents in this unit, and the entire Sonsela Member, are mainly north and northeast in contrast to the rest of the Chinle Formation, which mainly have northwesterly paleocurrents (Woody, this volume). This strongly suggests a different possible source area and depositional regime for this unit.

22.4 Agate Mesa. Junction. The road to the left leads to a parking area near Agate Bridge. Agate Bridge is a partially exhumed petrified log that spans a 40 foot wide ravine.



Figure 9. Logs along the trail in Crystal Forest weathering out of the Jim Camp Wash beds.

23.6 Junction. The road to the right leads to Jasper Forest Overlook. Formerly visitors could drive into Jasper Forest, but the road had to be removed to protect the petrified wood deposit from thieves. The petrified wood in the Jasper Forest is derived from the Flattops One bed of the Sonsela Member, which caps the mesa to the right.

25.2 The turnout to the left is for Crystal Forest. The irregular hill to the right is called the Battleship. Cavities in some of the logs in this area contain quartz crystals. Many of the logs were blasted apart by people searching for crystals during the late 1800’s. The wood in this “Forest” came from the Rainbow Forest beds or from the rocks above (Jim Camp Wash beds) (Fig. 9). Savidge and Ash (this volume) described a new genus and species of conifer from this locality.

26.1 Walker’s Stump. In 1935, park naturalist Myrl V. Walker excavated a standing “stump” in a low gray hill next to the prominent “Martha’s Butte” about a half mile west of the highway (Fig. 10). Leaf material was also recovered during this excavation (Walker, 1936).

26.4 Dry Wash. The road now precedes down section passing back through exposures of the Sonsela Member. Dry Wash is floored by a sandstone bed in the Jim Camp Wash beds. Jones and Ash (this volume) describe fossilized charcoal from this horizon and discuss its paleoecological implications. Well-developed paleosol horizons can be observed beneath an intraformational conglomerate of the Jim Camp Wash beds in the butte across the road.

27.5 Flattops. Ahead of us are a series of buttes called “the Flattops”. Exposures of the Petrified Forest Member are capped with a bed of hard sandstone (Flattops Sandstone Four) which has protected the underlying rocks from erosion. These exposures of the Petrified Forest Member are characterized by the presence of several ribbon sandstones that Billingsley (1985) termed Flattops Sandstones Two through Four (from

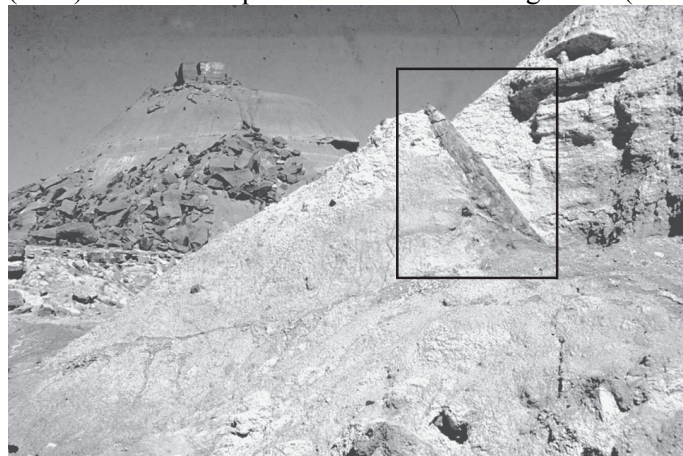


Figure 10. Walker’s Stump (see inset). (Courtesy of the AMNH).



Figure 11. "Ridge and swale" topography in the Flattops One bed north of the parkroad and south of the Flattops area.

bottom to top). The road is situated on the second Flattops Sandstone Bed, whereas Flattops Sandstone Four caps the buttes in the vicinity. Fossil mollusc beds are common in the mudstones between these sandstones, as are the remains of vertebrates. The phytosaur *Pseudopalatus* and the aetosaur *Typhothorax* are the most commonly recovered vertebrates from this unit.

28.0 Ridge and Swale Topography. To the left and below the road bed can be seen excellent exposures of "ridge and swale" topography in the Flattops One bed (Fig. 11). These have been interpreted as representing preserved scroll bars. The strata overlying the Flattops One bed contains a small quantity of scattered petrified logs.

28.3 Turnout. This turnout offers excellent views of the Sonsela and Petrified Forest Members of the Chinle Formation. The Flattops (to the northeast) and Red Butte (to the west) consist of reddish mudstone and thin intermittent sandstone ribbons of the Petrified Forest Member.

28.7 Flattops One bed. The road drives up onto the Flattops One bed (=Flattops Sandstone #1 of Billingsley, 1985) at this point.

29.0 Siliceous layer. The reddish material capping the small hills to the left of the road comes from a thin, strongly silicified bed which has been erroneously termed a silcrete (Woody, 2003) (Fig. 12). Creber and Ash (1990) observed



Figure 12. Siliceous layer capping and eroding from low hills in the foreground near Jim Camp Wash.



Figure 13. Agate House.

this distinctive layer in the late 1980s and attributed it to the petrification (silicification) of tree trunks that had been subject to fungal attack after dying. Strictly speaking the layer is not a silcrete because it does not contain sand and gravel and is organic in origin, and merely consists of plant matter, primarily wood that has been silicified. Indeed, examination of this layer demonstrates that it mainly consists of flattened pieces of fossil wood, and at several localities flattened tree trunks are clearly discernable in this layer. Whatever it is called, Ash and Creber (1990) and Woody (2003) state that this unit is always found within 7-9 meters above the main Rainbow Forest Bed and forms a useful stratigraphic marker because it is widespread throughout the region. Creber and Ash (1990) reported a similar siliceous layer at about the same stratigraphic level in New Mexico and Texas, while Woody (2003) observed it in southern Utah near Paria. Thus, there is strong evidence of a widespread coniferous forest that once existed in this region and now has all but disappeared!

30.3 The vast deposits of petrified wood on both sides of the road to which we are coming are collectively known as Rainbow Forest.

30.8 Entrance to trail to the Long Logs section of the Rainbow



Figure 14. Dick Grigsby in Rainbow Forest. Date unknown.

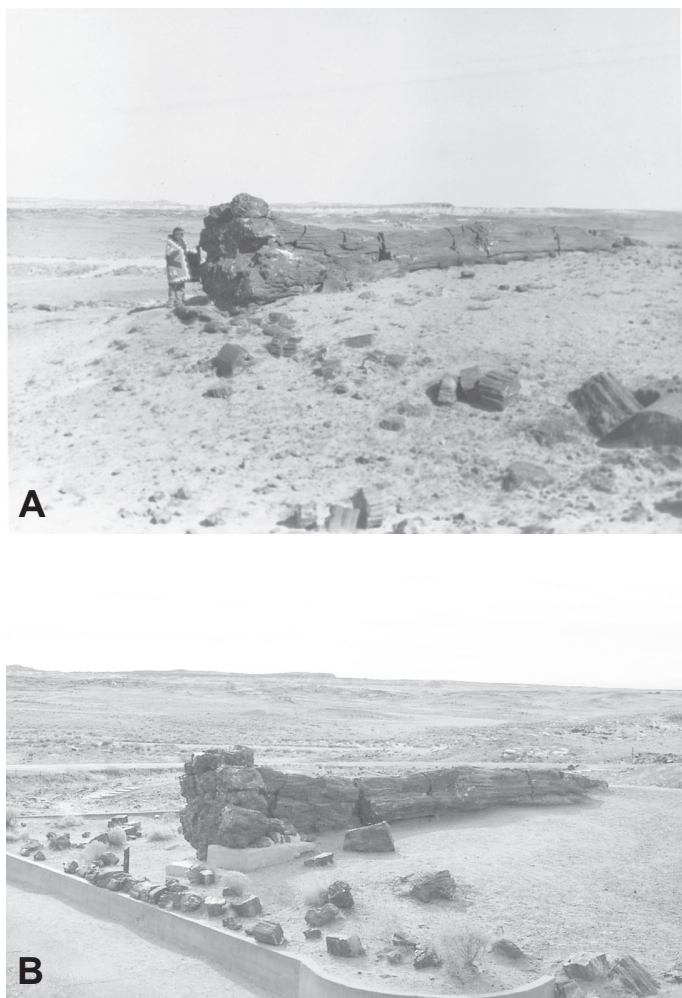


Figure 15. Old Faithful log at Giant Logs (Rainbow Forest). A, in a 1923 (courtesy of the UCMP); B, 2006. Concrete supports were added after log was struck by lightning in 1962.

Forest and Agate House. This section of the Forest contains many exceptionally long logs. Some of them appear to be meshed together in a “fossil” log jam. Agate House (Fig. 13) is a partially reconstructed Native American pueblo built of blocks of petrified wood. One of the early guides in this area is reputed to have told tourists that the pueblo was so old that the blocks in its walls had petrified after it was built.

30.81 Bridge over Jim Camp Wash. Rainbow Forest Museum and Historical District. The area was the original park headquarters from the 1920s until the Painted Desert Visitor Center was built to the north along Interstate 40 in the

early 1960s. The stone buildings were built by the Civilian Conservation Corps (CCC) in the 1930s. This area was the main contact station for park visitors and where information regarding the park was presented.

The original headquarters building is now a museum, which contains displays on Late Triassic paleontology. The other stone buildings serve as offices and residences for park staff. The Fred Harvey building (originally the Rainbow Forest Lodge) was built in the 1920s by local cowboy and entrepreneur Homer “Uncle Dick” Grigsby (Fig. 14). Grigsby was interested in the local fossil fauna and flora and often “donated” interesting fossils to vertebrate paleontologist Charles Camp and paleobotanist Lyman Daugherty, resulting in at least one plant being named in his honor, *Lyssoxylon grigsbyi* Daugherty (1941). Camp visited Grigsby regularly during his field seasons in Arizona and New Mexico. During the 1940s and 1950s a campground and picnic area was situated here.

Behind the Rainbow Forest Museum is a trail through the petrified wood deposit known as Giant Logs. The centerpiece of Giant Logs is a large specimen, with a basal circumference of almost 3 meters (Ash and Creber, 2000), christened by the wife of the first superintendent as “Old Faithful”. The Old Faithful log has been the subject of countless photographs and at 2:05 pm on June 29, 1962 was struck by a bolt of lightning causing heavy damage (NPS naturalist reports, 1962). Park staff decided to reconstruct the log and added concrete and a base for support. All of the logs in the southern end of the park have been assigned to a single taxon, *Araucarioxylon arizonicum* (However, see Savidge and Ash [this volume] for discussion of this taxon).

33.7 Rainbow Forest Entrance Station.

33.8 Park boundary. Just outside of the park entrance are two commercial businesses that sell souvenirs, petrified wood, and offer information about the park. These facilities are not associated with the National Park Service and are not part of Petrified Forest National Park. The petrified wood they sell was obtained outside the boundaries of Petrified Forest National Park.

Turn right at intersection on U.S. Highway 180 and return to Holbrook.

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